

In the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1 1. (Previously Presented) A method for reducing noise in a
2 sampled acoustic signal, comprising:

3 receiving a stream of sampled acoustic signals;

4 digitizing each sampled acoustic signal thereby forming
5 digital samples;

6 selecting a fixed number of digital samples;

7 multiplying the digital samples by a windowing function;

8 computing the fast Fourier transform of the selected windowed
9 digital samples to yield transformed windowed signals;

10 selecting half of the transformed windowed signals;

11 calculating a power estimate of the transformed windowed
12 signals;

13 calculating a smoothed power estimate by smoothing the power
14 estimate over time using the equation:

$$P^t(i) = (1-\alpha) P^{t-1}(i) + \alpha P(i)$$

18 where: $P^t(i)$ is the smoothed power estimate for a current time
19 sample to be calculated for the i -th FFT point; $P^{t-1}(i)$ is the
20 smoothed power estimate for an immediately prior time sample for
21 the i -th FFT point; $P(i)$ is the calculated power estimate of the
22 transformed windowed signals for the i -th FFT point; and α is an
23 experimentally chosen predetermined value called the smoothing
24 factor;

25 calculating a noise estimate;

26 calculating a gain function from the noise estimate and the
27 smoothed power estimate;

28 calculating a transformed speech signal by multiplying the
29 gain function with the transformed windowed signal;
30 calculating an inversed fast Fourier transform of the
31 transformed speech signal to yield a sampled speech signal; and
32 adding the sampled speech signal to a portion of the speech
33 signal of a previous frame.

1 2. (Original) The method of Claim 1, wherein the fixed
2 number of samples is thirty-two.

1 3. (Original) The method of Claim 1, wherein the windowing
2 function is a hanning window function.

1 9. (Previously Presented) A system for reducing noise in an
2 acoustical signal comprising:
3 a sampler for obtaining discrete samples of the acoustical
4 signal;
5 an analog to digital converter coupled to the sampler and
6 operable to convert the analog discrete samples into a digitized
7 sample;
8 a noise suppression circuit coupled to the analog to digital
9 converter and operable to:
10 receive the digitized samples;
11 select a fixed number of digitized samples;
12 multiply the digitized samples by a windowing function;
13 compute the fast Fourier transform of the windowed
14 digitized samples to yield transformed windowed signals;
15 select half of the transformed windowed signals;
16 calculate a power estimate of the transformed windowed
17 signals;
18 calculate a smoothed power estimate by smoothing the power
19 estimate over time using the equation:

20

21
$$P^t(i) = (1-\alpha) P^{t-1}(i) + \alpha P(i)$$

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23 where: $P^t(i)$ is the smoothed power estimate for a current time
24 sample to be calculated for the i -th FFT point; $P^{t-1}(i)$ is the
25 smoothed power estimate for an immediately prior time sample for
26 the i -th FFT point; $P(i)$ is the calculated power estimate of the
27 transformed windowed signals for the i -th FFT point; and α is an
28 experimentally chosen predetermined value called the smoothing
29 factor;

30 calculate a noise estimate;

31 calculate a gain function from the noise estimate and the
32 smoothed power estimate;

33 calculate a transformed speech signal by multiplying the
34 gain function with the transformed windowed signal;

35 calculate an inversed fast Fourier transform of the
36 transformed speech signal to yield a sampled speech signal; and

37 add the sampled speech signal to a portion of the speech
38 signal of a previous frame.

1 10. (Original) The system of Claim 9, wherein the fixed
2 number of samples is thirty-two.

1 11. (Original) The system of Claim 9, wherein the windowing
2 function is a hanning window function.